DOCUMENT RESUME

ED 052 802 LI 002 947

AUTHOR	Parks, Celia; Julian, Carol
TITLE	Information Scanning and Processing at the Nuclear Safety Information Center.
INSTITUTION	Oak Ridge National Lab., Tenn.
SPONS AGENCY	Atomic Energy Commission, Oak Ridge, Tenn.
REPORT NO	ORNL-NSIC-48
PUB DATE	Jul 71
NOTE	55p.; (129 references)
EDRS PRICE	EDRS Price MF-$0.65 HC-$3.29
DESCRIPTORS	Documentation, *Information Centers, *Information Dissemination, *Information Processing, *Information Science, *Nuclear Physics, Safety
IDENTIFIERS	*Nuclear Safety Information Center

ABSTRACT

This report is a detailed manual of the information specialist's duties at the Nuclear Safety Information Center. Information specialists scan the literature for documents to be reviewed, procure the documents (books, journal articles, reports, etc.), keep the document location records, and return the documents to the plant library or other lender. These basic duties (selection and acquisition, cataloging, and general record-keeping) represent some of the key functions in the dissemination of information, and the procedures are designed to achieve the goal of error-free, economical operation. (Author)

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION
THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL OFFICE OF EDUCATION POSITION OR POLICY.

ED052802

ORNL-NSIC-48

Contract No. W-7405-eng-26

Nuclear Safety Information Center

INFORMATION SCANNING AND PROCESSING AT THE NUCLEAR SAFETY INFORMATION CENTER

Celia Parks*
Wells Fargo Armored Service Corporation
San Francisco, California

Carol Julian
Reactor Division
Oak Ridge National Laboratory

*Formerly employed in the Reactor Division, ORNL

JULY 1971

OAK RIDGE NATIONAL LABORATORY
Oak Ridge, Tennessee
operated by
UNION CARBIDE CORPORATION
for the
U.S. ATOMIC ENERGY COMMISSION

LT 00 2 947

This report was prepared as an account of work sponsored by the United States Government. Neither the United States nor the United States Atomic Energy Commission, nor any of their employees, nor any of their contractors, subcontractors, or their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness or usefulness of any information, apparatus, product or process disclosed, or represents that its use would not infringe privately owned rights.

CONTENTS

	Page
Preface	v
Abstract	1
NSIC Services and Organization	1
Duties of Information Specialist	4
Scanning the Literature for Pertinent Items To Be Reviewed	5
Procuring Reports, Journal Articles, Books, and Other Material	9
Record Keeping	13
Entries on the Greensheet (Office Form)	15
Proofreading and Logging Typed Material	25
Returning or Filing Material	25
Miscellaneous Duties	26
Summary and Conclusions	26
References	27
Appendix A. Categories of Nuclear Safety	31
Appendix B. Journals Abstracted by NSIC	35
Appendix C. Codes for Type of Document and Evaluation	40
Appendix D. Nuclear Safety Information Center Reports	43
Appendix E. Source Codes for Availability Citations	49

PREFACE

The Nuclear Safety Information Center was established in March 1963 at the Oak Ridge National Laboratory under the sponsorship of the U.S. Atomic Energy Commission to serve as a focal point for the collection, storage, evaluation, and dissemination of nuclear safety information. This report describes the Center's information scanning and processing activities and gives insight into the importance of the information specialists relative to the smooth functioning of an information center. They serve in a fashion that allows the NSIC technical staff to concentrate on answering technical inquiries, writing review articles and reports, and cataloging pertinent reference material.

A system of keywords is used by the information specialists to index the information cataloged by the Center. The title, authors, author's installation, abstract, and keywords for each document reviewed are recorded at the central computer facility in Oak Ridge. The references are cataloged according to categories such as Operational Safety and Experience, Accident Analysis, etc.

Computer programs have been developed that enable NSIC to (1) produce topical indexed bibliographies of its accessions (issued with ORNL-NSIC report numbers), (2) operate a routine program of Selective Dissemination of Information (SDI) to individuals according to their particular profile of interest, and (3) make retrospective searches of the references stored on magnetic tapes at the computer facility.

Other services of the Center include (1) state-of-the-art reports (issued with ORNL-NSIC report numbers); (2) the bimonthly technical progress review, Nuclear Safety; (3) answering technical inquiries; and (4) counsel and guidance on nuclear safety problems.

Services of NSIC are provided without charge to government agencies, research and educational institutions, and the nuclear industry. All documents may be examined at the Center by qualified personnel; NSIC reports, however, are the only documents that are available for distribution by request. Inquiries concerning the capabilities and operation of the Center may be addressed to:

J. R. Buchanan, Assistant Director
Nuclear Safety Information Center
Oak Ridge National Laboratory
Post Office Box Y
Oak Ridge, Tennessee 37830
Telephone 615-483-8611, Ext. 3-7253
FTS Number 615-483-7253

INFORMATION SCANNING AND PROCESSING AT THE NUCLEAR SAFETY INFORMATION CENTER

Celia Parks Carol Julian

Abstract

This report is a detailed manual of the information specialist's duties at the Nuclear Safety Information Center. Information specialists scan the literature for documents to be reviewed, procure the documents (books, journal articles, reports, etc.), keep the document location records, and return the documents to the plant library or other lender. These basic duties (selection and acquisition, cataloging, and general record-keeping) represent some of the key functions in the dissemination of information, and the procedures are designed to achieve the goal of error-free, economical operation.

NSIC Services and Organization

There are many types of information centers with various types of organization. The Nuclear Safety Information Center, established in 1963 by the USAEC Division of Reactor Development, is organized to collect, analyze, and spread nuclear-safety-oriented information throughout the nuclear community.[1,2] Some of the many NSIC activities established to accomplish these objectives are listed below:

1. Preparation and publication of state-of-the-art reports
2. Cooperation in preparation of *Nuclear Safety*, a bi-monthly technical progress review
3. Preparation of abstracts of nuclear safety literature
4. Publication of topical bibliographies
5. Selective dissemination of information (SDI)
6. Answering technical inquiries
7. Preparation of special retrospective bibliographies
8. Provision of information on current research and development
9. Provision of technical consultation

10. Collection of documents for review by qualified visitors

NSIC's director is also director of the ORNL Nuclear Safety Research and Development Program and editor of the technical progress review Nuclear Safety. NSIC's assistant director is responsible for the overall supervision of the Center's activities. The professional staff at NSIC consists of over 30 technical specialists, the information specialists, and editors, as listed in Table 1. The technical specialists are scientists or engineers who divide their time between working on research and development problems and working at the Center. In this way, they are current both in what is going on in their specialty and in the documentation of new results. While working at NSIC, they write state-of-the-art reports, abstract documentary material, and act as consultants to people in the nuclear industry.

Two of the technical staff work principally with the computerized aspects of the Center, set up special searches, process the Selective Dissemination of Information profiles, and handle file maintenance. The NSIC programming is done at the Computing Technology Center. Most of the information processing was initially done on the IBM-7090, but a complete changeover to the IBM-360 computer has been accomplished.[3] The two most recent equipment additions at the Center are the IBM-2740 typewriter printer and the IBM-2260 cathode ray-tube (CRT) consoles.

The IBM-2740, which looks like an oversized typewriter, provides a direct link to the core of the computer used to store the NSIC data files. All the information entered into the computer's data files carries keywords for retrieval. The IBM-2740 can be used to ask the computer to display what it has stored at the keyword HEAT TRANSFER, for example, and the machine will print out the author(s), title, corporate author, and other bibliographic information for each of the items stored at that address. If there are more than 25 to 50 items, the searcher may wish to further define his query with another keyword. In this case, the computer may be asked, for example, to print out the items indexed to HEAT TRANSFER and HEAT TRANSFER AUGMENTATION. The combination of the two addresses may put

Table 1. NSIC Staff Assignments

Wm. B. Cottrell, Director
J. R. Buchanan, Assistant Director

Staff Member			Subject Area		Time Spent Working for NSIC (%)
Name	Profession	Degree	Title	Category No.	
J. P. Blakely,	Chemist	BS	General Safety Considerations	1	10
R. H. Bryan, and	Nuclear Engineer	PhD			10
M. H. Fontana	Mechanical Engineer	PhD			10
H. B. Piper	Nuclear Engineer	BE	Siting — General and General Technical Specialist	2	100
O. H. Myers	Health Physicist	BS	Earthquake Considerations	2	10
R. D. Seagren	Development Engineer	BS	Transportation and Handling of Nuclear Materials	3	10
S. P. Hendrix	Consultant	BA	Aerospace Safety	4	10
J. L. Wantland and	Mechanical Engineer	PhD	Heat Transfer and Thermal Transients	5	10
T. S. Kress	Mechanical Engineer	MS			10
M. L. Tobias	Physicist	PhD	Reactor Transients, Kinetics, and Stability	6	10
G. W. Keilholtz	Physical Chemist	PhD	Fission-Product Release, Transport, and Removal	7	50
H. A. McLain	Chemical Engineer	PhD	Sources of Energy Release	8	10
E. W. Hagen	Instrument Engineer	MS	Control and Safety Systems and Electrical Power Systems	9 10	50
J. G. Merkle and	Civil Engineer	MCE	Containment of Nuclear Facilities	11	10
C. A. Sweet	Mechanical Engineer	BS			
W. G. Stockdale	Chemical Engineer	MS	Plant Safety Features — Reactor	12	10
			Plant Safety Features — Nonreactor	13	
F. M. Empson and	Chemical Engineer	BS	Radionuclide Release	14	50
B. L. Houser	Sr. HP Technician		Environmental Surveys	15	50
S. D. Swisher[a]	Meteorologist	MS	Meteorological Considerations	16	50
R. L. Scott	Physicist	BS	Operational Safety and Experience	17	75
R. D. Gallaher and	Chemical Engineer	MS	Safety Analysis and Design Reports	18	30
P. H. Harley	Chemical Engineer	BS			30
B. R. Fish and	Physicist	MS	Radiation Dose to Man	19	50
C. F. Holoway	Chemist	MS			
M. M. Yarosh,	Nuclear Engineer	MS	Thermal Modifications	20	10
J. K. Franzreb and	Chemical Engineer	BS			50
J. G. Morgan	Development Engineer	MS			50
R. M. Carroll and	Physicist	BS	Radiation Ecology	21	50
C. D. Bopp	Development Engineer	BS			50
F. A. Heddleson	Mechanical Engineer	BS	PPIF and Reactor Data		100
M. L. Winton	Electrical Engineer	BS	SDI and Reactor Codes		100
D. N. Hess	Chemist	BS	Technical Writing and Environmental Information		100
H. B. Whetsel	Chemist	BS	Technical Editing		100
E. L. Hairston[b]	Mathematician	BS	Computer Programmer		100
M. C. Julian and	English major		Information Specialist		100
J. D. Brown	English major				100

[a] U.S. Department of Commerce, National Oceanic and Atmospheric Administration.

[b] Computing Technology Center.

the request in the proper range to prevent a deluge of inappropriate references. The items desired may either be printed at the computer facility or listed on the IBM-2740. Since all the indexing terms are available in the form of a keyword thesaurus, it is simple to select the keywords, type them to the computer, and receive the printout of references.

The IBM-2260 consoles are being used for direct data input to the computer. This bypasses the keypunching step previously required. In addition to the input and inquiry capability, the remote stations are also used for direct maintenance of the computer files.

Duties of Information Specialist

The major job of literature acquisition, record keeping, routing, and cataloging of abstracts for storage is done by the information specialist, whose duties may be divided into six categories:

1. scanning and locating,
2. ordering and procuring,
3. keeping track of documents at the Center,
4. preparing documentation of abstracts for typing,
5. proofreading and logging,
6. placing source documents in final repository.

NSIC processed over 15,000 items during 1970 and there are over 53,000 items in the NSIC accession files, 49,000 of which are in the computer data bank. The NSIC system is growing rapidly, and therefore the information specialist's operation must remain flexible to expand with the Center's growth. The Center may be one of the largest users of the libraries of the Oak Ridge National Laboratory because it borrows between 700 and 800 documents a month, which supply 82% of the NSIC document input. The remaining documents are obtained from other installations through direct distribution. Because most documents are borrowed, the NSIC system must include special provisions to prevent their loss or damage. This may mean keeping track of more than 10,000 documents at a time, although the average number of items in the system is usually around 5000 to 6000.

Documents flow through NSIC in the following steps (see Fig. 1 for flow chart):

1. The information specialist selects information for review during a scan of new issues of technical journals, books, abstract journals, reports of conferences, lists of report titles, etc.

2. The information specialist checks for duplication in system and orders items selected.

3. When material arrives at NSIC, it is logged into the system and routed to the appropriate technical specialist (reviewer).

4. The reviewer abstracts the material, selects appropriate keywords, and puts the abstract and keywords on the "greensheet." The greensheet, so-called because it is customarily printed on green paper, is Form UCN-6107A, which presents the information needed to index a document into the NSIC master file (see Fig. 6 of the next section for an example of the greensheet). The reviewer returns the material abstracted and the greensheet to the information specialist.

5. The information specialist fills out the rest of the greensheet, assigns an NSIC accession number, and sends the document and greensheet to the editor.

6. The editor checks the abstract for readability, verifies the keywords, and sends the material to the typists.

7. The typist types the greensheet data into the IBM-2260, which puts the information directly into the computer.

8. The information specialist logs the accession number in the files and returns the report to the lender.

9. The greensheets are held for two week until corrections can be made.

10. The assistant specialist files the greensheets.

Scanning the Literature for Pertinent Items To Be Reviewed

Scanning is the first step in the NSIC flow of material and one of the most important, since it keeps the center supplied with a regular flow of fresh, pertinent material. An idea of what is involved in scanning may be gained by considering that well over 4000 report titles, more than 20

ORNL-DWG 70-15291

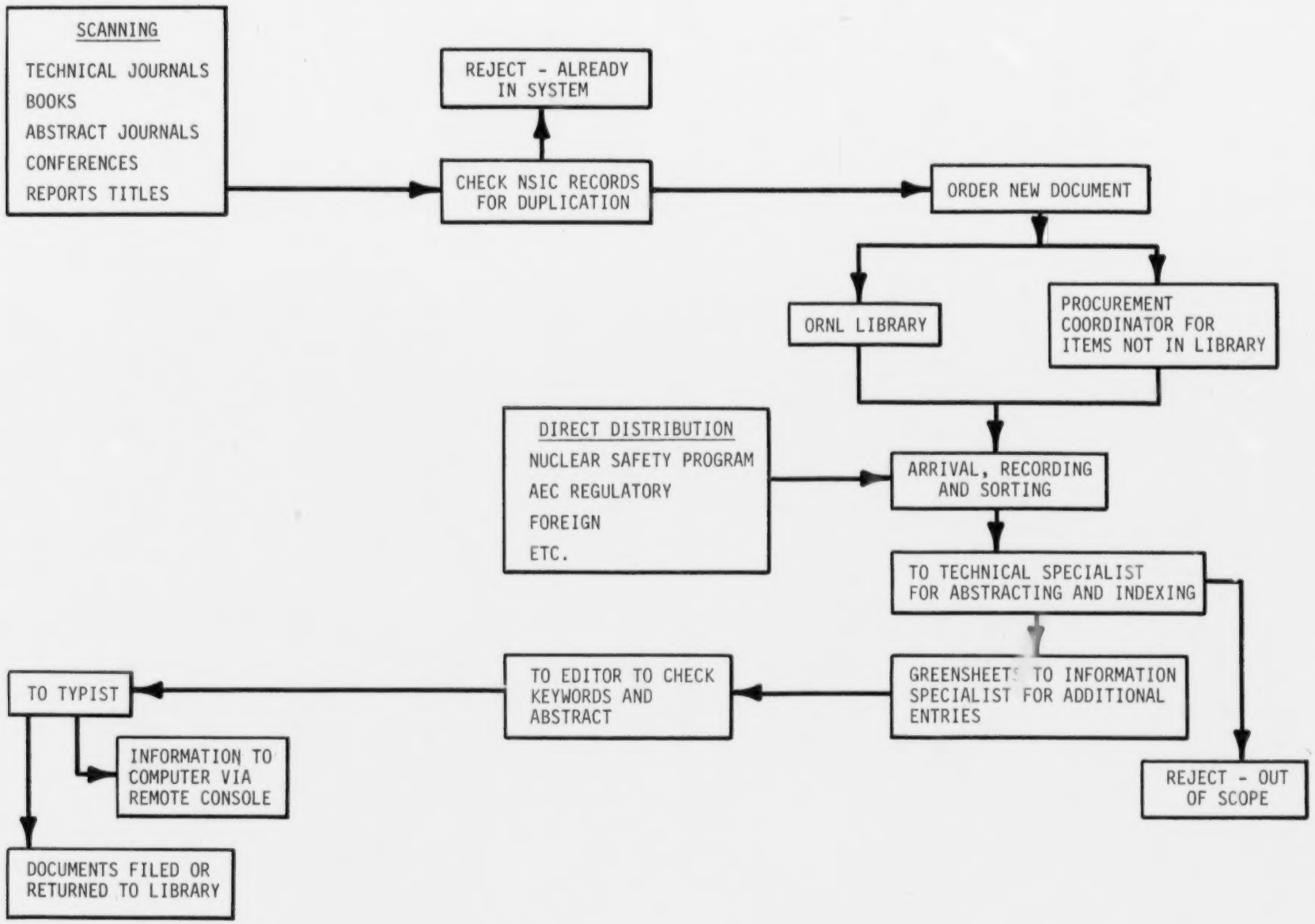

Fig. 1. Flow Chart for NSIC.

journals, some of which are in foreign languages, and more than 1000 other journal titles are scanned each month. Some major sources of these items are listed below:

1. ORNL Library Accession List
2. *Nuclear Science Abstracts*
3. Foreign and domestic exchange agreements
4. EURATOM information
5. *Publications in the Nuclear Sciences* (IAEA)
6. *List of References on Nuclear Energy* (IAEA)
7. *Current Contents*
8. *Plutonium Abstracts*
9. *Meteorological Abstracts*
10. Bibliographies, such as
    A Selected Listing of NASA Scientific and Technical Reports
    Liste Recapitulative des Textes C.E.A. Publies dans la Presse Scientifique 1962-1964
    List of Publications, September 1959 to March 1966 (Atomic Energy of Canada)
11. Press releases
12. Conference transactions: ANS, ASME, AIEE, ASTM, ACS, IAEA, IEEE, Health Physics Society, American Industrial Hygiene Society, Heat Transfer Conference, Hot Labs, American Power Conference
13. Patents (U.S. and foreign)

The two major ways for source material to come into NSIC are through direct distribution and through the scanning and ordering process. When an organization is doing the type of work that regularly falls into the NSIC scope, the Center asks for routine distribution of its documents. This usually accounts for about 18% of the NSIC report input. The bulk of the Center's input must be obtained by the scanning and ordering process.

The information specialist starts by going over the acquisition lists issued weekly by the USAEC Division of Technical Information Extension (DTIE) and the Oak Ridge National Laboratory (ORNL). These lists include complete bibliographic citations suitable for ordering documents. Both

lists are prepared in report form and as 3- × 5-in. cards (see Fig. 2 for examples of these cards).

The cards are preferred for scanning because they can be immediately incorporated into the record-keeping system. There is a 3- × 5-in. card in the files for every item that has ever passed through NSIC. If the item

ORNL DWG 70-15292

Uncl (BNWL–1445) INVESTIGATION OF MIXED OXIDE $(U_{0.75}Pu_{0.25})O_2$ PROCESSING USING A NINE VARIABLE FRACTIONAL FACTORIAL EXPERIMENT. Barr, M. J.; Jaech, J. L.; Anderson, A. G. (Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.). Jul 1970. Contract AT(45-1)-1830. 73p. Dep. CFSTI.

ceramics; reactor fuels 11B, 18J

STD-80 P NSA

AN ORNL CARD

OCT 1 1970

COO–1018-1215 Uncl

BIDDING SPECIFICATIONS FOR THE WIRE–WRAP WIRING OF THE 1018-299-00 PRINTED CIRCUIT BOARD. Krabbe, Paul (Illinois Univ., Urbana. Dept. of Computer Science). 11 Aug 1970. 10p.

electronics and electrical engineering

ND-38 P RC

Unlimited

A DTIE CARD

OCT 1 1970

Fig. 2. Examples of Some Cards Issued by Oak Ridge National Laboratory and Division of Technical Information Extension.

is from other than the ORNL or DTIE lists, a card is prepared that presents the bibliographic information. NSIC subscribes to bibliographies, such as *Euratom Information*, the *IAEA List of References on Nuclear Energy*, and *Nuclear Science Abstracts*, and regularly scans many other topical and company bibliographies, such as those produced by Argonne National Laboratory and Battelle Memorial Institute, as well as lists of references in reports. In scanning foreign journals, it is helpful to know a few key words in the major foreign languages.

Roughly 20% of the bibliographic listings duplicate those already scanned and, if selected for ordering, can be found quickly in the order file, which is a temporary file, or in the master file. With these two checks, most duplication is eliminated.

The objective of the scanning is to find all the reports, journal articles, etc., that might be of interest to the technical specialists. Of the titles scanned, less than 10% of those ordered are duplicates or material outside the NSIC scope (see App. A for NSIC scope and category listing).

Procuring Reports, Journal Articles, Books, and Other Material

Reports with alphanumeric numbers may be obtained readily, particularly the reports published by USAEC contractors, but reports published by the Eastern European and Asian countries are difficult to secure. As a rule of thumb, NSIC subscribes to journals that regularly publish at least three articles of NSIC interest per issue. There are about 20 of these journals. All other journal articles of interest are ordered through the ORNL library. (Appendix B lists journals abstracted at NSIC; journals subscribed to by NSIC are indicated with an asterisk.)

Not many books are abstracted by NSIC because there are not many books on safety topics, but approximately 20 books are reviewed per month. For the most part, these are selected from the library's acquisition lists, but some come from book advertisements. Book reviews are another good source, and a hard-to-get book is often abstracted from its review. Most books ordered for the permanent NSIC collection are conference proceedings.

In addition to material selected by scanning, there is a large amount of material obtained directly through an agreement with the AEC regulatory

staff. These documents relate to the licensing for construction and operation of nuclear facilities, principally power reactors. The collection for each reactor starts with a safety analysis report, which is followed by many amendments, supplements, etc. These licensing documents filed at NSIC comprise the most complete collection outside the USAEC Public Document Room in Washington, D.C.

NSIC orders each month between 700 and 800 documents, between 300 and 400 journal articles, about 20 books, and about 50 patents. Most orders are placed through the ORNL library, which also provides such important services as checking references and arranging interlibrary loans.

The first step in the ordering process is, as mentioned previously, to look for duplication by checking the card file to determine whether the information has been received previously at NSIC. The cards for reports are filed alphanumerically by report number. The journal file is set up by alphabetic journal name and then by issue and volume number; the book file has a cross reference of the title to the author. Cards for other items, such as press releases and patents, are filed by the most standard bit of identification (i.e., patent number and press release number). Cards listing conference papers are filed by initiating organization so that the cards for all meetings of a particular group, say, the American Nuclear Society, are in the same place in the file. Even with this precise system, it is often difficult to spot duplications, since some items have as many as three alphanumeric designations and may also reappear as a journal article and a conference paper. Where possible, such items are cross referenced, since it is simpler to make up three or four cross-reference cards than to order and return documents.

After all the cards and cross references are made, each new card is checked against the order file, which is a small file that contains only the cards for material to be ordered. Two lists are then made of the cards for material remaining to be ordered by Xeroxing the cards. One copy of the list is cut up, and the card copy is put with the card original. The other copy of the list is used as the library order list. The card copy and the card original are placed in a plastic folder and checked against the master file, which has a card for every item that has ever entered the NSIC system. If the card is truly a new entry, the plastic folder is

filed in the master file. If the citation is a duplicate, the cards are destroyed and the citation is crossed off the library order list.

The library then uses the order list to supply documents and make arrangements for interlibrary loan of material close to the local area. There is usually a small number of references that are not local, so the library sends these back to NSIC for ordering from outside the area. This additional processing consists of filling out form UNC-5502 (see Fig. 3), which is sent to the Information Center Procurement Coordinator. NSIC always specifies that it wants a full-size loan copy. The Information Center Procurement Coordinator obtains items such as patents, translations, and limited-distribution unclassified reports, of which about 50 are ordered each month for NSIC.

ORNL-DWG 70-15293

amco sets 4 ivan allen

TO: INFORMATION CENTER PROCUREMENT COORD. RM. 192 – BLDG. 4500NM CENTRAL RESEARCH LIB.

ITEM IDENTITY	NO. OF COPIES	REQUEST DATE	COORDINATOR ACTION TO	COORDINATOR ACTION DATE	DATE COMPLETED

TITLE

AUTHOR(S)

ORIGINATING ORGANIZATION OR PUBLISHER

VOLUME	PAGE(S)	YEAR	EDITION	COST

DOCUMENT DATE	CONTRACT NO	☐ Translation	SOURCE OF REFERENCE

TYPE OF REPRODUCTION

☐ Full size copy ☐ Microfiche MICROFILM: ☐ 16MM ☐ 35MM

RETENTION

☐ Permanent ☐ Loan

REQUESTING CENTER | BLDG. | ROOM

SIGNED BY | CHARGE

REMARKS

PREPARE 5 COPIES AND DISTRIBUTE

1. Requester forwards original and 3 copies to coordinator – Retains last carbon.
2. Coordinator forwards original and 2 copies to appropriate Dept for action – Retains last carbon
3. Upon completion of order original, showing date completed, is attached to requested item and forwarded to requester.
4. Copy showing date completed is forwarded to coordinator.
5. Copy showing date completed is retained.

UCN-5502
(3 2-64)

ORNL INFORMATION CENTER REQUEST

5

Fig. 3. Form Used to Order Material Not Found on the Area.

Copies of journal articles are ordered in a similar fashion. A card is prepared for each article to be ordered and checked against the order and master files. One Xerox list of the journal cards is then made and given to the library (see Fig. 4), which provides a Xerox copy of the journal article and returns the Xerox copy of the card with it. The card copy identifies the article properly.

Patents are ordered directly through the Information Center Procurement Coordinator. Books are ordered through the library by using only one Xerox copy of the original card. It is usually necessary to make a more complete card on the book when it arrives.

It is also important to have a followup on the initial order to prevent the files becoming clogged with items that cannot be obtained. If an item has not been obtained by the end of one year, it becomes inactive and the master card is marked to indicate the disposition.

The NSIC files are set up on a color-coded system, with the colors being the bands of color across the top of the plastic card cover. The colors indicate the following:

RED – Material ordered between January and June

GREEN — Material ordered between July and December

ORNL-DWG 70-15294

Bulletin of the Seismological Society of America, 60(2): 393-446 (April 1970)

Study of Regional Seismicity and Associated Problems
J. F. Evernden

Fig. 4. Example of a Journal Article Order for ORNL Library.

BLACK — Material circulating inside NSIC system

NO CARD COVER — Material processed through the system and filed or returned; or, material is an inactive order

The files are audited twice a year to change the order colors and to review material not yet received to decide whether to keep the order active and to start followup measures.

Followups are accomplished by making a Xerox list of the cards, on which the initial order date was stamped, and sending it to the library. Many times the followup is a way of assuring that documents recalled by the library before being abstracted at NSIC will be returned. If NSIC is at the bottom of a rather long waiting list for a document, the followup assures getting the document eventually. When a followup is made the color is changed and the card is put back for another six months. The initial order date on the front of the card is checked at each followup period to determine when to remove the item from the active order list.

The color coding works most effectively with the documents and books that are obtained on loan and which form the largest part of the NSIC ordering. Only the in-system color (black) is required for journal articles, which are permanent acquisitions. For patents and conference papers that belong to NSIC, no color is needed, but the acquisition date is stamped on the back of the card.

Record Keeping

When books and reports are received on loan from the library, a check is made to assure that there is a card in the files for that item. If there is not, a card is made and a Xerox copy is attached to the document. If there is a card and a Xerox copy, the copy is placed with the document, the plastic cover on the card is changed from the order color to black, the arrival date is stamped on the back of the card, and the same date is stamped on the routing slip for sending the document to the subject specialists. (See Fig. 5 for an example of the information that may be put on the card.) When it is necessary to recall a document, this date tells how long the material has been in the system and thus is a clue to where it should be. After the document is located it is returned to the library,

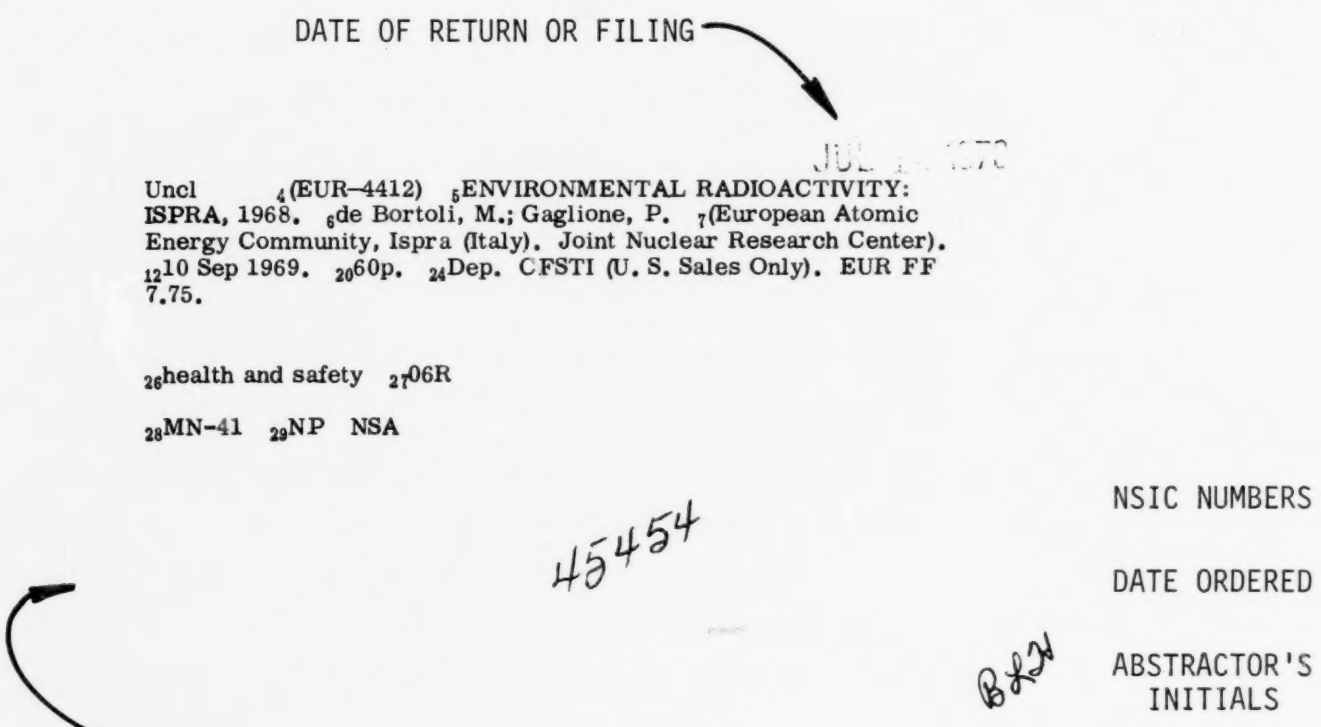
ORNL-DWG 70-15295
DATE OF RETURN OR FILING
JUL
Uncl 4(EUR-4412) 5ENVIRONMENTAL RADIOACTIVITY: ISPRA, 1968. 6de Bortoli, M.; Gaglione, P. 7(European Atomic Energy Community, Ispra (Italy). Joint Nuclear Research Center). 1210 Sep 1969. 2060p. 24Dep. CFSTI (U. S. Sales Only). EUR FF 7.75.
26health and safety 2706R
28MN-41 29NP NSA
45454
NSIC NUMBERS
DATE ORDERED
BKH
ABSTRACTOR'S INITIALS
(ON BACK OF CARD)
DATE RECEIVED

Fig. 5. The Information on the File Card.

the card copy is put back in the file with the card, and the order-colored plastic cover is again put on the card group.

When journal-article copies are received from the library, there is no need to pull a card copy from the files because the articles arrive with the card copy already on them. A routing slip is added and the article sent to the proper reviewer. Occasionally, the library cuts off the bottom of a long abstract or loses the card copy, so to make sure that all the necessary information is with the journal article, a Xerox copy of each card is kept.

An effort is made to have either an NSA abstract or an abstract from a press release announcing issuance of the patent for each patent ordered, but the card for the abstract is not made until the patent is received. The abstract is attached to the patent, along with the routing slip, and sent to the technical specialist, who is often able to use the abstract and thus needs only to add keywords to complete the greensheet.

Since USAEC docket material is obtained automatically through an agreement with the AEC Regulatory Staff, the ordering processes are not required. Another difference is that it is retained on the NSIC shelves. Special attention is given to keeping this collection complete and up to date, and as a result, NSIC has the most complete collection of this material outside the USAEC Public Document Room in Washington. The docket collection is regarded as reference material and as such may be used by any qualified visitor who comes to the Center. However, just like all library reference items, NSIC does not lend the docket items.

As for other items, a card is made for the docket material, which is then sent to the appropriate reviewer. The cards are filed by docket number (a number assigned by the AEC to each applicant for a license) and by date. Docket material rarely has an alphanumeric number.

Except for the docket file number and the NSIC accession number, which appear on the front of the card, all other notes are put on the back of the file card. Every movement of this material is recorded, rather than just its date of entry and date of exit, as for the loan documents. This extra bookkeeping is necessary to enable locating material quickly when a visitor wants to see it. After the docket material has been processed, it is filed on the shelves in the NSIC reference room. Each item is given a file number composed of its docket number and its shelf-position number, but the NSIC accession number remains its major identification. The 34th item filed in the space for Docket 50-256 will have 1256.34 as its file number. All loose items are filed in folders so that when a visitor takes something off the shelf, he can leave the file folder in place to show what item is out.

Entries on the Greensheet (Office Form)

The technical specialist (reviewer) decides either to reject the report or to initiate action to catalog the report into the NSIC system. About 10% of the reports are rejected as being outside the NSIC scope. To start the cataloging action, the reviewer writes an abstract or forms an abstract from the report and selects the keywords (which are the word addresses used to file material in the computer memory) from the list in the NSIC thesaurus. He also fills out the sections of the greensheet

marked REPORT NUMBER OR OTHER IDENTIFICATION, ABSTRACTORS INITIALS, TYPE, EVALUATION, CATEGORY, TITLE, ABSTRACT, and KEYWORDS, and he may add the SIGNIFICANT DATE, LANGUAGE, and COUNTRY. The information specialist fills out the rest of the greensheet.

The greensheet entries are listed and described below (see overlay numbers on greensheet in Fig. 6 for entry number):

1. Report Number or Other Identification. The technicial specialist puts the report number, the journal name, the book's author, or some other sort of identification in this space.

2. Abstractor's Initials. The technical specialist identifies himself by his initials.

3. Accession Number. This is the identification number given to each item in the NSIC master file. It is assigned by the information specialist from an NSIC number logbook in which the technical specialist's initials, the report number, and the local availability (which is where the ORNL people can get the item) are entered. These numbers are assigned in consecutive order so that each number represents the latest entry into the master file up to that point. A note is also made as to whether the item is an unclassified or proprietary report. The NSIC accession number is also the file number for all the nondocket material kept at NSIC. There is only one NSIC number per greensheet, and it is right-justified.

4. Type. The code for the type of item being abstracted is inserted by the technical specialist to show that the item is a book, thesis, patent, bibliography, trip report, topical report, etc.; a complete list of the types is given in Appendix C. This is one of the codes that can be used for a computer search.

5. Evaluation. The technical specialist "rates" the report as exceptionally good, good, average, or below average, and this rating is used as an "in-house" aid in making specialized searches. It is not printed out in either the SDI or the indexed bibliography.

6. Category. NSIC has divided the subject of nuclear safety into 21 categories, which are used as a means of selecting SDI profiles, and as limitors when making literature searches of the master files. In general, there is one technical specialist assigned to each category. These specialists put the code numbers for the category on the greensheet. Spaces

REPORT NUMBER OR OTHER IDENTIFICATION ①

NSIC BIBLIOGRAPHIC REPORT

ABSTRACTORS INITIALS ②

1–7 ACCESSION NUMBER	8–9 CARD NO.	13–15 ⑥ TYPE	16 ⑦ EVALUATION	17–22 ⑤ CATEGORY	23–26 JOURNAL ABBREVIATION	27–32 ③ SIGNIFICANT DATE MO	DAY	YR.	33 LANGUAGE	34 COUNTRY	35–40 SUBJECT NUMBER
	0 1										

41–49 CORPORATE AUTHOR	50 FORMAT	51 BIBLO. LIMIT	52 REPORT	54–55 PROPRIETARY

AVAILIBILITY

TITLE: ④

ABSTRACT (ABOUT 100 WORDS)

ENTRIES 1, 2, 3, AND 4 ARE QUITE SIMPLE.

⑩

ENTRIES 5, 6, 7, 8, 9, 10 CAN BE MADE ONLY AFTER YOU HAVE REVIEWED THE DOCUMENT.

SEE CHAPTER 12.6 FOR EXAMPLES OF COMPLETED GREEN SHEETS.

KEY WORDS ⑧

THE EXAMPLES AND COMMENTS SUMMARIZE MUCH OF WHAT IS SAID IN THIS BOOKLET.

THE REVIEWER MAKES NO ENTRIES IN THE OTHER BOXES.

NEW KEY WORD ⑨

UCN-6107A (3 10-67) NOTE: NEW KEY WORDS MUST BE DEFINED; ATTACH DEFINITION ON 3 X 5 CARD.

Fig. 6. The Greensheet.

for three categories provide for reports that may be of interest in more than one category.

7. Journal Abbreviation. This is the code used to identify the journal name. It is assigned by the information specialist from *Codes for Periodic Titles, An Aid to Storage and Retrieval of Information and to Communication Involving Journal References,* which is published by the American Society for Testing and Materials as ASTM Special Publication No. 329. There are four blanks allowed for this code, so Publication No. 329 is used rather than the newer edition, which has five-letter codes that supersede the four-letter codes. The computer can search on this information.

8. Significant Date. For reports, the date of publication is used as the significant date; for journals, the journal's date; and for patents, the date of government issue. For conference papers, it is the date of the conference rather than the date the paper was written or submitted. This date can be put in the blanks by either the technical specialist or the information specialist. The date is frequently useful for restricting computer searches and for keeping the most current material on the SDI and indexed bibliography.

9. Language and Country. The codes are filled in from a list (Table 2) of letter codes identifying the language and the country that are in most instances the first letter of the language or country. The technical specialist usually fills in the most common codes such as E and A and leaves the uncommon ones for the information specialist to fill in. The computer can recognize this code so that "English-Only" searches can be produced if desired.

10. Subject Number. The information specialist assigns this code to reports from nuclear safety projects sponsored by the AEC Division of Reactor Development and Technology. This is an in-house tool to sort reports issued by these projects.

11. Corporate Author Code. These blanks are for a code to indicate the corporate author (the company of the author of the report or the company or organization that published the report). The information specialist assigns this code from a coding system set up at NSIC by using USAEC report TID-5059 (6th ed.) as a reference basis. There are spaces for

Table 2. Abbreviations for Machine for Countries of Origin and Languages

Language Abbreviation[a]	Language	Country	Country Abbreviation
C	Czeck	Czechoslovakia	C
D	Danish	Denmark	D
E	English	United States of America	A
		O-India	O
		Q-Canada	Q
		United Kingdom	U
F	French	France	F
		BeLgium	L
G	German	Germany	G
		AusTria	T
H	Hungarian	Hungary	H
I	Italian	Italy	I
J	Japanese	Japan	J
K	TurKish	TurKey	K
N	Norwegian	Norway	N
P	Portuguese	Portugal	P
		Brazil	B
R	Russian	Russia	R
S	Spanish	Spain	S
		Mexico	M
W	SWedish	SWeden	W
Y	Yugoslav	Yugoslavia	Y
X	X-Other	X-Other	X[b]
Z	Z-Dutch	Z-Netherlands	Z

[a]The letters V for China and W for Egypt are not used and these countries are not listed.

[b]Used for New Zealand, Israel, Switzerland, and Poland.

three corporate author codes, which can be used for a computer search. If there are more than three corporate authors, the extra entries are made in the bibliographic citation but are unavailable for search. One of the duties of the information specialist is to maintain the corporate author code. The code files were computerized by the Computer Technology Center at K-25 so that two types of files are outputted from the same input, and the master file is kept and updated by the information specialist. The master file has cards and cross references sorted alphabetically by corporate author. The card lists the corporate-author name, the corporate-author code, and whether or not this form of the name is preferred over other forms. The second type of file contains only preferred corporate cards and is used by the typists to check corporate author entries to determine the correct entry. For example, Oak Ridge National Laboratory can be listed in the following ways and not be wrong: ORNL, X-10, and Union Carbide Nuclear Division, Oak Ridge, Tennessee. However, we prefer Oak Ridge National Laboratory, Oak Ridge, Tennessee. The NSIC master file has over 2200 entries, and the typist file has about half that many. The extra cards in the master file represent cross references so that an organization, no matter how many name changes or satellite groups it has, can be designated by only one code. This is important for getting a complete group of abstracts during a corporate author search.

New codes are assigned by working down the alphabetic permutations from AAA to ZZZ, with the last letter varying the fastest (i.e., AAA, AAB, AAC, etc.). At one time an attempt was made to assign the codes by using mnemonic combinations, but since the code is restricted to only three letters, it soon became difficult to assign unique codes. It was found that alphabetic permutations were much faster to assign and also provided a way of telling which codes were new.

12. Format. This code indicates that the material should be keypunched in a manner other than the usual one-paragraph form used for the abstract. It is used primarily to ask the keypunchers to set up the abstract in the "table-of-contents" format. The information specialist puts a "1" in this column at the request of the technical specialist.

13. Bibliographic Limit. This code decides whether the material will be printed in the indexed bibliography. The information specialist puts a

"1" in this column to show that the report is being put on the master file for background information rather than current awareness.

14. Report. This code is used to show that the report has an alphanumeric number(s). The information specialist puts a "1" in column 52 (see Fig. 7 for an example of a completed greensheet) and then the typist puts the alphanumeric number in the first part of the line preceding the abstract (see Fig. 8 for an example of computer output). The symbols "plus period" (+.) mark the end of the searchable portion of the report identification. Multiple numbers are connected with a plus so that an entry may look like this:

ORNL-P-2711 + CONF-660,413-2 +.,

and then it will be followed with the number of pages, figures, tables, references, the date, and other pertinent bibliographic information. This report code is used to call for all the alphanumeric numbers for preparing a report number index, for example.

15. Proprietary. These two columns are used to allow NSIC to computerize material that must have a proprietary storage area. Proprietary material is restricted, unclassified material, as distinguished from classified material. Most of the restrictions on proprietary material are patent restrictions, limited distribution, preliminary-report restrictions, and official-use-only markings. The proprietary code is designed by NSIC to direct material to a separate file and to provide a searchable address for it. The proprietary material has all the searchable handles of open-literature material plus the additional searchable code.

The code is assigned just for the major corporate author. The most frequently used corporate authors were given unique codes, and the occasional entries are put under their first letter in a "general" code. There are blank numbers in the code to allow room for expansion. The code is restricted to two digits, so there are 99 possible codes.

16. Availability. This is the "where-to-get-it" entry. It is made by the information specialist. NSIC tries to see that every item released to the public is available in one form or another. The Center supplies only documents that carry the ORNL-NSIC numbers (see App. D for a list of these documents).

REPORT NUMBER OR OTHER IDENTIFICATION: RISO-150

NSIC BIBLIOGRAPHIC REPORT

ABSTRACTORS INITIALS: WGS 2/28/68

ACCESSION NUMBER	CARD NO.	TYPE	EVALUATION	CATEGORY	JOURNAL ABBREVIATION	SIGNIFICANT DATE MO	DAY	YR.	LANGUAGE	COUNTRY	SUBJECT NUMBER
27239	01	N	X	13		06		67	E	D	

CORPORATE AUTHOR	FORMAT	BIBLO. LIMIT	REPORT	PROPRIETARY

AVAILIBILITY

TITLE: Pilot-Plant Vitrification of Simulated Radioactive Waste

ABSTRACT (ABOUT 100 WORDS)

Discusses two pilot-plant procedures – discontinuous melting in a stainless-steel cylinder used for permanent storage, and continuous melting in a ceramic container. The glass is removed by continuous overflow and collected in steel cylinders for disposal. Corrosion of stainless steel no problem. Corrosion of ceramic material serious in the long term, according to present knowledge. Reviews design features and future development.

KEY WORDS

★ Radiochemical Plant Safety
Waste disposal, general
" " , liquid
Waste handling
Corrosion
★ Radiochemical Processing
Denmark
★ Waste Treatment, Fixation
Waste Treatment, Liquid
Glass

NEW KEY WORD

UCN-8107A (3 10-67) NOTE: NEW KEY WORDS MUST BE DEFINED; ATTACH DEFINITION ON 3 X 5 CARD.

Fig. 7. Completed Greensheet Ready for Computer Input.

PARTS AND METHOD OF INDEXING ABSTRACTS

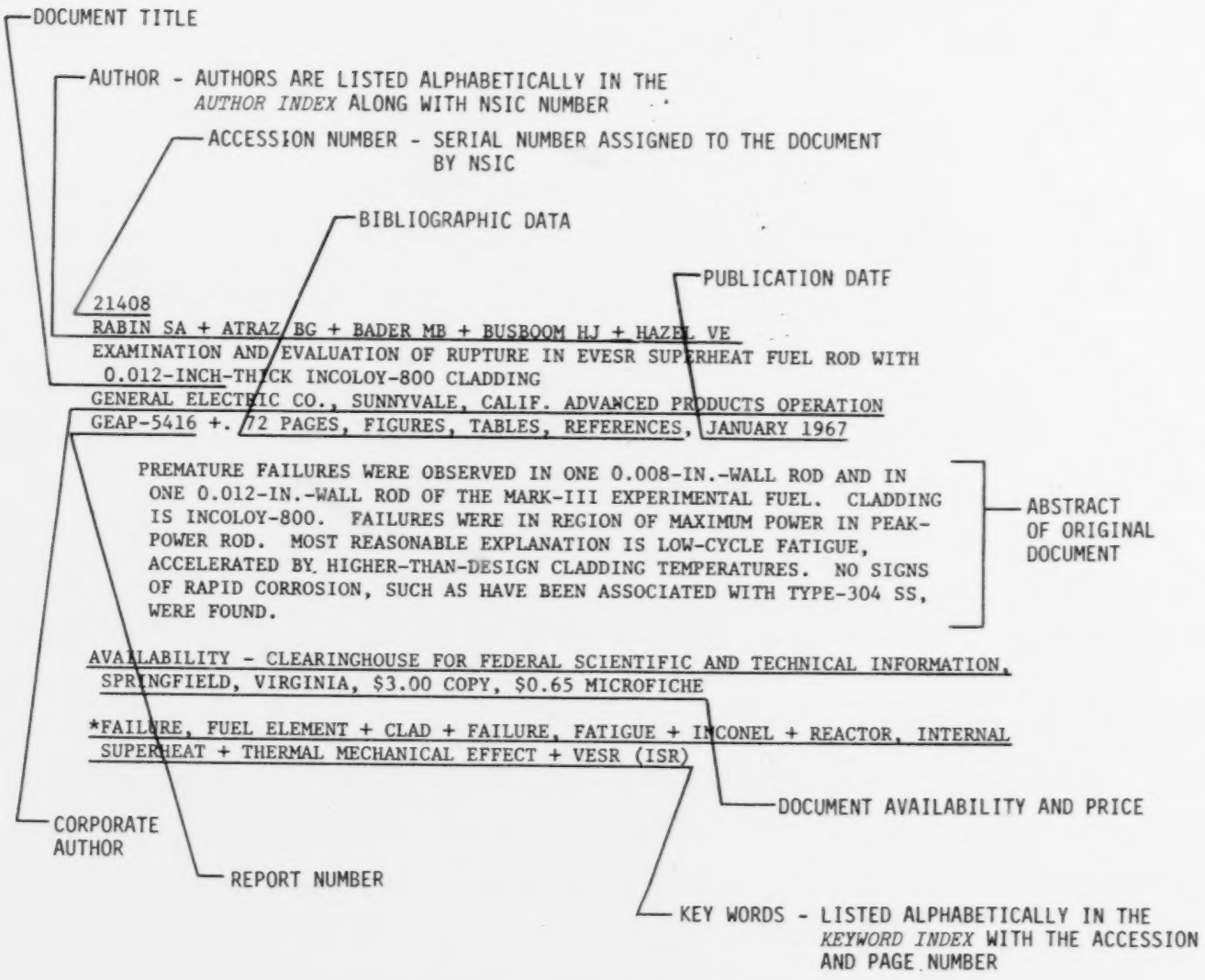
DOCUMENT TITLE
AUTHOR - AUTHORS ARE LISTED ALPHABETICALLY IN THE AUTHOR INDEX ALONG WITH NSIC NUMBER
ACCESSION NUMBER - SERIAL NUMBER ASSIGNED TO THE DOCUMENT BY NSIC
BIBLIOGRAPHIC DATA
PUBLICATION DATE
21408
RABIN SA + ATRAZ BG + BADER MB + BUSBOOM HJ + HAZEL VE
EXAMINATION AND EVALUATION OF RUPTURE IN EVESR SUPERHEAT FUEL ROD WITH 0.012-INCH-THICK INCOLOY-800 CLADDING
GENERAL ELECTRIC CO., SUNNYVALE, CALIF. ADVANCED PRODUCTS OPERATION
GEAP-5416 +. 72 PAGES, FIGURES, TABLES, REFERENCES, JANUARY 1967
PREMATURE FAILURES WERE OBSERVED IN ONE 0.008-IN.-WALL ROD AND IN ONE 0.012-IN.-WALL ROD OF THE MARK-III EXPERIMENTAL FUEL. CLADDING IS INCOLOY-800. FAILURES WERE IN REGION OF MAXIMUM POWER IN PEAK-POWER ROD. MOST REASONABLE EXPLANATION IS LOW-CYCLE FATIGUE, ACCELERATED BY HIGHER-THAN-DESIGN CLADDING TEMPERATURES. NO SIGNS OF RAPID CORROSION, SUCH AS HAVE BEEN ASSOCIATED WITH TYPE-304 SS, WERE FOUND.
ABSTRACT OF ORIGINAL DOCUMENT
AVAILABILITY - CLEARINGHOUSE FOR FEDERAL SCIENTIFIC AND TECHNICAL INFORMATION, SPRINGFIELD, VIRGINIA, $3.00 COPY, $0.65 MICROFICHE
*FAILURE, FUEL ELEMENT + CLAD + FAILURE, FATIGUE + INCONEL + REACTOR, INTERNAL SUPERHEAT + THERMAL MECHANICAL EFFECT + VESR (ISR)
DOCUMENT AVAILABILITY AND PRICE
CORPORATE AUTHOR
REPORT NUMBER
KEY WORDS - LISTED ALPHABETICALLY IN THE KEYWORD INDEX WITH THE ACCESSION AND PAGE NUMBER

Fig. 8. Parts and Method of Indexing

There are several standard availability sources, but the most common is the National Technical Information Service (NTIS). Appendix E lists some of the other sources. The availability information was formerly carried as the last item in the section preceding the abstract, but it became so important that now it has its own section in the format and appears after the abstract. The information specialist investigates to find out where the item is on sale and then enters the code. The local availability, which is where the ORNL people can find the item, is listed on the second line of the Availability box. The local availability does not appear in the bibliography, but ORNL employees can locate a cited item by calling either the library or NSIC.

17. Title. This portion of the greensheet is usually filled in by the technical specialist. Normally he reviews the whole item and puts the title of the book, document, patent, etc., on the title line. Sometimes when he wants to review only a chapter of a book or a section of a document, he uses the chapter or section title, or, if the section has no heading, he makes up a title. In that case, the book or document title appears in the 05 section of the citation.

18. Abstract. The technical specialist may write his own abstract or use the author's abstract. There are several NSIC rules for writing abstracts, which are covered in a report by the NSIC editor[4] (see report ORNL-NSIC-47). Generally a 100-word limit is suggested because it is the number of words that fits an SDI card. The NSIC computer cannot print either superscripts or subscripts, so they cannot be in the title or abstract. The use of formulas is discouraged because they are not very readable when reduced to capital letters on a single line.

19. Keywords. The keywords are selected by the technical specialist from the NSIC thesaurus of about 3000 terms for indexing and later retrieval of references. The editor maintains the keyword list and verifies the keywords. A section on this subject is included in his report.[4]

20. New Keywords. When the technical specialist wants a new keyword, he submits it along with its definition to the technical editor. The definition is incorporated into an NSIC keyword dictionary, and the keyword goes into the thesaurus.

Proofreading and Logging Typed Material

After the information specialist completes the greensheet, it and the report are given to the technical editor for reviewing the abstract and checking the keywords for accuracy. From the technical editor the report and the greensheet go to the typists. The typist puts the information in the correct form and then gives the report and the computer input sheet to the information specialist, who proofreads the bibliographic information and the availability section against the card in the master file. If satisfied that the typed bibliographic information and availability correspond with the information on the card, the information specialist stamps the date of completion at the top of the card, takes the black plastic cover off the card, writes the NSIC number on the card, and puts it back in the files. The date is stamped at the top of the card so that it is possible to go through the files quickly and check which items left the system and when without unfiling the cards. After the information specialist finishes proofreading the input sheet, it goes to the editor.

Returning or Filing Material

All loan documents are marked with the name and plant address of the lender, and these are put into the plant mail immediately after the typed greensheet is proofread. Other material is divided into throw-aways, library donations, and NSIC reports.

The disposition of direct-distribution reports is determined by establishing how hard it would be to get another copy of the report. If it would not be difficult, the report is given to the library, from which it can be requested when needed. These reports are usually those available at NTIS or some other large distributor. Difficult-to-get reports are filed by NSIC accession number at the center. These include items such as proprietary reports, press releases, patents, and conference papers. Available duplicates are given to the library.

The NSIC collection is considered reference material just like the docket collection, and visitors are welcome to view it at the Center. Loans are not made, however, because of frequent need and the reference nature of the material.

Miscellaneous Duties

The preceding presents the major activities of the information specialists at the Nuclear Safety Information Center, but there are others. Information must be maintained for answering the frequent "have-we-done-this?" or the "do-we-have-this?" questions. All the files are the responsibility of the information specialist and, correspondingly, all the filing, which must be orderly so that material may be found quickly.

Such housekeeping is important in keeping an information center clean and running. In the words of Pipino Vlannes, Deputy Director, Army Technical Information Office:

> "... consider the functions that information systems have to perform to support the services they furnish their clients. There are three basic functions involved. They are the following:
>
> Selection and acquisition
> Cataloging (and sometimes indexing and abstracting)
> Record keeping
>
> Even the relatively simple descriptive or non-subject aspects or document cataloging are rife with detail and potential housekeeping pitfalls.
>
> "Housekeeping is the most expensive, time-consuming and error-prone activity performed by a computerized retrieval system. It is not something that can be taken for granted or skimped on. Housekeeping should be made an integral part of the design of any retrieval system. ... If provision for good housekeeping is not made a part of the system in the first place, it gets provided for later, most likely after considerable expense and anguish. ... systems rise and fall on [housekeeping]."[5]

Summary and Conclusions

Each of the information specialist's duties is a link in the chain of the information center, and each link must be well kept or the whole chain is weakened. The information specialist strives to provide the Nuclear Safety Information Center with the complete input through an effective scanning process; operates an efficient ordering service, coordinated with the libraries; insures that all the items located in the scanning come into the Center; maintains the bookkeeping system

accurate and current; works for an orderly method for getting the information processed and typed; proofreads the typed items to assure that they are as error free as possible; and continuously updates the collection of reference items to reflect the growing needs of the nuclear industry. In essence the information specialist tries to harness the energy released by the information explosion.

References

1. J. R. Buchanan and Wm. B. Cottrell, A Summary of NSIC Activities 1963–1967, USAEC Report ORNL-NSIC-46, Oak Ridge National Laboratory, September 1968.

2. J. R. Buchanan and F. C. Hutton, Analysis and Automated Handling of Technical Information at the Nuclear Safety Information Center, *American Documentation*, Vol. 18, No. 4, October 1967.

3. J. R. Buchanan and E. M. Kidd, Development of a Computer System with Console Capability for the Nuclear Safety Information Center, Oak Ridge National Laboratory, *Proceedings of the American Society for Information Science, October 1–4, 1969*, Vol. 6.

4. H. B. Whetsel, Guidelines for Reviewers and the Editor at the Nuclear Safety Information Center, USAEC Report ORNL-NSIC-47, Oak Ridge National Laboratory, January 1970.

5. P. Vlannes, Requirements for Information Retrieval Networks, pp. 10 and 11 in *Colloquium on Technical Preconditions for Retrieval Center Operations*, edited by B. F. Cheydleur, Spartan Books, 1965.

APPENDICES

Appendix A

CATEGORIES OF NUCLEAR SAFETY

Brief descriptions of the technical scopes of the categories of information reviewed at the Nuclear Safety Information Center follow:

1. General Safety Considerations

   Deals with all safety aspects of radiation policy, standards, codes, cost, financial liability, and insurance. Covers also the comparative risk to public health and safety from nuclear and nonnuclear hazards.

2. Siting of Nuclear Facilities

   Considers factors used in evaluating sites, e.g., facility design, proposed operation, population density, use characteristics of the environs, physical characteristics of the site, earthquake considerations, and the relation between engineered safeguards and nuclear-facility siting.

3. Transportation and Handling of Radioactive Materials

   Pertains to shipping containers, shipping regulations, criticality safety, transportation accidents, design of tiedowns, shipping conditions (impact, fire, vibration, etc.), heat-transfer capability, etc.

4. Aerospace Safety

   Deals with safety considerations unique to nuclear systems used in aerospace vehicles — launch and re-entry problems only.

5. Heat Transfer and Thermal Transients

   Considers all facets of the analysis of postulated accidents. Includes burnout heat flux, critical heat transfer, reliability analyses, thermal-mechanical effects, in-pile experiments, coolant-activity buildup, and experiments such as in LOFT. Studies and experiments related to reactor kinetics are catalogued in Category 6.

6. Reactor Transients, Kinetics, and Stability

   Includes the studies, analytical and experimental, such as those conducted in TREAT and SPERT, in which the transient behavior of reactors and criticality accidents are examined. Deals, for example, with reactivity effects due to voids and temperature, Doppler coefficient, etc.

7. Fission Product Release, Transport, and Removal

   Pertains to the release of fission products from various materials and their movement within a nuclear-facility containment system. Transport of fission products involves the physical and chemical characterization of the released radionuclides and also includes

such mechanisms as deposition, adsorption, filtration, fallout, plateout, etc.

8. Sources of Energy Release Under Accident Conditions

Considers nuclear, Wigner, and gamma energies, also energy released by chemical reactions, metal-water reactions, and all other types of energy that might be released as a result of a nuclear accident (e.g., steam-engendered explosion).

9. Nuclear Instrumentation, Control, and Safety Systems

Includes the design of control and safety systems for various nuclear processes, as well as the required instrumentation and hardware. The problems involved are — the performance required of safety systems; the specification of instrumentation; the concepts of coincidence, redundance, failure modes, and reliability; adequacy of shutdown margins; design features of mechanical devices; and related subjects.

10. Electrical Power Systems

Deals with routine and emergency means of supplying electrical power to nuclear facilities of any kind. Includes all phases of the generation and distribution of electrical power to and within a nuclear power plant. Considers the reliability of the power system and the effects of system disturbances on safety and operation of the reactor.

11. Containment of Nuclear Facilities

Encompasses all aspects of pressure containment, pressure-related containment, and multiple-barrier containment for reactors, radiochemical plants, hot cells, sources, etc. Includes design considerations, leakage, penetrations, structural integrity (piping and pressure vessel), and leak testing.

12. Plant Safety Features — Reactor

Covers all engineered safety features of reactors except containment. Includes systems for reducing temperature and pressure, air cleaning, disposal of liquid waste, and core cooling. Other topics include maintenance, decontamination, fuel-element protective devices, etc.

13. Plant Safety Features — Nonreactor

Deals with facilities associated with the external fuel cycle and with the use of radioactive material created by nuclear fission. Major divisions — mining, ore conversion, enrichment, fuel-element fabrication, hot cells, fuel processing, fuel conversion, waste disposal, and radioisotopes.

14. Radionuclide Release and Movement in the Environment

Pertains to intentional or accidental releases of radionuclides to the environment, along with the subsequent fate of the materials. Considers the nuclide source (reactor, chemical processing plant,

waste-management scheme, fallout, etc.). Deals with release of radionuclides, effluent-control systems, behavior and cycling of radionuclides in the biological and chemical environments (including analytical methods), and counter-measures to retard or prevent release or movement.

15. Environmental Surveys, Monitoring, and Radiation Dose Measurements

Includes information related to (1) environmental and personnel monitoring during routine or accidental releases of radionuclides, (2) monitoring methods, and (3) measurements of external exposure to individuals or population groups in the immediate environs of nuclear facilities.

16. Meteorological Considerations

Considers not only diffusion and deposition of radioactive material near the surface of the earth in connection with reactor operations but also the atmospheric transport and fallout in the troposphere and stratosphere as a result of nuclear-weapons tests.

17. Operational Safety and Experience

Covers the safety aspects of routine reactor operation and of incidents or unusual operating occurrences, large or small. Includes power, research, and test reactors, also fuel-processing plants.

18. Safety-Analysis and Design Reports

Deals largely with safety-analysis and design reports for reactors not yet operational. The reports are generated by facility designers and by the AEC Regulatory Staff.

19. Radiation Dose to Man from Radioactivity Release to the Environment

Primary emphasis is on factors related to internal exposure of man to radionuclides in the environment. Pertinent material includes the metabolic and dosimetric characteristics of radioactive or toxic wastes which bear on hazards resulting from deliberate or accidental releases to the environment.

20. Effects of Thermal Modifications of Ecological Systems

Pertains to natural and man-modified heat budgets of water bodies and other environments and to negative and positive influences of thermal releases on the environment's suitability for man and other organisms. The influence of heat on circulation of radionuclides in the biosphere is included as are the engineering aspects of thermal plume behavior. Considers various alternate means of dissipating heat such as cooling towers.

21. Effects of Radionuclides and Ionizing Radiation on Ecological Systems

Includes the movement of radionuclides released to environmental pathways through accidental releases, through low-level waste discharges,

and through ecological experiments using tracers. Considers the effects of ionizing radiation on natural populations of organisms where the radiation is part of their environment. The interacting influences of ionizing radiation and natural environmental factors with respect to mortality, reproduction, and other functions of plants and animals are included.

Appendix B

JOURNALS ABSTRACTED BY NSIC

The following list of journals includes only the prominent ones reviewed and abstracted by the technical specialists at NSIC.

Academy of Sciences of the USSR, Proceedings of the
ACTA Crystallographica
Aerospace Medicine
Aerospace Sciences, Journal of the
AIAA Journal
AIChE Journal
Air Pollution Control Association, Journal of the
Air Repair
American Chemical Society, Journal of the
**American Documentation*
American Geophysical Union, Transactions of the
American Industrial Hygience Association Journal
American Institute of Mining and Metallurgical Engineers
American Nuclear Society, Transactions of the
Analyst
Analytical Chemistry
Annales de Geophysique
Annals of Occupational Hygiene
Applied Chemistry (London), Journal of
Applied Mechanics, Journal of
Applied Meteorology, Journal of
Applied Physics, Journal of
Archives of Environmental Health
Arkhimedes, Journal of Finnish Physical Society
ASHRAE Journal
Atmospheric Environment, Journal of

---

*Journals subscribed to by NSIC.

Atmospheric Sciences, Journal of

Atmospheric and Terrestrial Physics, Journal of

Atom

Atomic Energy (USSR)

**Atomic Energy Clearing House*

Atomnaya Energiya

Atomics

Atomkernenergie

**Atompraxis*

Atom und Strom

**Atomwirtschaft*

Australian Journal of Applied Science

Battelle Technical Review

British Chemical Engineering

British Coal Utilisation Research Association, Monthly Bulletin

**British Nuclear Energy Society, Journal of*

Brisish Journal of Radiology

Bulletin of the American Meteorological Society

**Bulletin d'Information Scientifique et Technique (Paris)*

Canadian Journal of Chemical Engineering

Canadian Chemical Processing

Canadian Electronics Engineer

Canadian Journal of Physics

Chemical Documentation, Journal of

Chemical Education, Journal of

Chemical Engineering - Transactions of the Institute of Chemical Engineers

Chemical Engineering

Chemical & Engineering Data Series

Chemical and Engineering News

Chemical Engineering Progress

Chemical Engineering Science

Chemical & Process Engineering

Chemie-Ingenieur Technik

Chemische Technik

Chemistry & Industry (London)
Chimica, la et l' Industria (Milan)
Colloid Science, Journal of
Comptes Rendus
Concrete and Constructional Engineering
Control and Automation Progress
Czechoslovak Journal of Physics
Dissertation Abstracts
Dopovidi Akademic Nauk Ukrains' koi RSR
Electrochemical Society, Journal of the
Electrochemical Technology
Energia Nucleare
Energie Nucleaire
Engineer
Engineering for Industry, Journal of
Engineering for Power, Journal of, Transactions of the ASME
Federation Proceedings, Transactions Supplement
Fluid Mechanics, Journal of
Geochimica et Cosmochimica Acta
Geomagnetism and Geoelectric, Journal of (Kyoto)
Geophysical Research, Journal of
**Health Physics*
Hitachi Hyoron
Hygiene, The Journal of
IEEE, Transactions on Nuclear Science
Industrial and Engineering Chemistry, Journal of
Industrial and Engineering Chemistry, Fundamentals
Industrial and Engineering Chemistry, Process Design and Development
Industrial Laboratories
Ingenieur-Archiv
Institute of Fuel, Journal of
International Journal of Air and Water Pollution
**International Journal of Heat and Mass Transfer*
ISA Transactions
Isotopes and Radiation Technology

Kernenergie
Kerntechnik
Laboratory Practice
Machine Design
Mathematics and Physics, Journal of
Metals, Journal of
Materials, Journal of
Materials Protection
Material Research & Standards
Measurement Techniques (USSR)
Mechanical Engineering
Meteorology, Journal of
Nature
Nippon Genshryoku Gakkaishi
**Nuclear Applications & Technology*
**Nuclear Energy, Journal of*
**Nuclear Engineering*
Nuclear Engineering Bulletin
**Nuclear Engineering and Design*
Nuclear Instruments and Methods
Nuclear Materials, Journal of
**Nuclear News*
**Nuclear Safety*
**Nuclear Science and Engineering*
Nucleonics Week
Nukleonik
Physical Chemistry, Journal of
Physics of Fluids
Physical Review
**Power Reactor Technology*
Proceedings of the Royal Society (London)
Przemysl Chemiczny
Quarterly Journal of the Royal Meteorological Society
Radio and Electronic Engineer
Radiological Health Data

*Reactor Materials
Science
Scientific American
Seismological Society of America, Bulletin of the
*Soil Science
Soil Science Society of America Proceedings
Spacecraft, Journal of
Stadtehygiene
Tellus
Transactions of Institution of Chemical Engineers
Water Pollution Control Federation, Journal of the
Weather
Zeitschift fur Meteorologie
Zeitschrift fur Naturforhschung

Appendix C

CODES FOR TYPE OF DOCUMENT AND EVALUATION

Type Codes

The type code letters are entered in columns 13 through 15 of the greensheet (see Fig. 6), and the evaluation code is entered in column 16. These entries are made by the technical specialists. The type code indicates whether the item being abstracted is a report, journal article, etc., and since an item may fall into more than one type, provision was made for three type code entries on the greensheet. The type codes are listed and explained below:

CODE	EXPLANATION
A	DATA SOURCE: A collection of tabular and/or graphical data. The collection may range from handbook or report size to a page or less in an engineering-data journal.
B	BIBLIOGRAPHY: B is used for the usual bibliography or to denote the fact that a document contains one.
C	THEORETICAL EXPOSITION: Denotes any document in which theory represents the main theme. It may also be used to indicate especially useful theory in a document in which experimental work is the central issue.
D	STATE-OF-THE-ART REVIEW: This applies to extensive reviews.
E	PRIMARILY OF HISTORICAL IMPORTANCE: Refers to a document that traces the ancestry of a reactor type, apparatus, theory, etc., or to a document in which chronology dominates.
F	ELEMENTARY, NONTECHNICAL DISCUSSION.
G	PROGRESS REPORT: A periodical document about a single subject or possibly several related ones. Intended for special audiences such as AEC sponsors and others

intimately connected with the work. More or less a diary of work done to reach one or more major objectives.

H ENGINEERING REPORT: These are straightforward engineering reports about large-scale work or about laboratory work intended to provide engineering data. Some may be conceptual design reports or will represent detailed design.

I THESIS.

J BOOK.

K PATENT.

L TRANSACTIONS: This includes the publications resulting from meetings and symposiums.

M NEWS RELEASES AND PRESS REPORTS: These are often concerned with regulatory information and sometimes have recent viewpoints or other news about some aspects of nuclear safety.

N TOPICAL REPORT: Any report about completed, soundly evaluated work is a topical report. Topical report means a report issued by AEC contractors, National Laboratories, NASA, Naval Research and Development Lab., etc. This excludes anything issued by a technical society or, for example, a journal article.

O JOURNAL ARTICLE.

P MOVIE FILM.

Q LICENSING AND REGULATORY MATERIAL: This includes pre- and postoperational material. The postoperational material is often in the form of amendments to the preoperational material.

R TRIP REPORT

S PROGRESS REVIEW: This applies to review articles such as those in *Nuclear Safety*.

Evaluation Codes

The evaluation codes are an internal tool of NSIC used to limit the size of the computer printouts. The following is a listing of the evaluation codes:

Z	Exceptionally good
Y	Good
X	Average
W	Below Average

Appendix D

NUCLEAR SAFETY INFORMATION CENTER REPORTS

ORNL-NSIC-1 Effects of Particle Agglomeration on the Penetration of Filters Utilized with Double Containment Systems, by M. H. Fontana and W. E. Browning, Jr., September 1963

ORNL-NSIC-2 Nuclear Safety Contract File, by J. R. Buchanan, November 1963

ORNL-NSIC-3 Current Practices in the Release and Monitoring of ^{131}I at NRTS, Hanford, Savannah River, and ORNL, by K. E. Cowser, August 1964

ORNL-NSIC-4 Behavior of Iodine in Reactor Containment Systems, by G. W. Keilholtz, February 1965

ORNL-NSIC-5 U. S. Reactor Containment Technology, A Compilation of Current Practice in Analysis, Design, Construction, Test, and Operation, by Wm. B. Cottrell and A. W. Savolainen, Eds., August 1965

ORNL-NSIC-6 Index to Microfiche Collection of Selected Technical Information on Containment of Nuclear Facilities (for use at the Third Geneva Conference), September 1964

ORNL-NSIC-7 Secondary Shutdown Systems of Nuclear Power Plants, by C. S. Walker, January 1966

ORNL-NSIC-8 Indexed Bibliography of Current Nuclear Safety Literature No. 1, by NSIC Staff, April 1965

ORNL-NSIC-9 Indexed Bibliography of Current Nuclear Safety Literature No. 2, by NSIC Staff, August 1965

ORNL-NSIC-10 Current Nuclear Safety Research and Development Projects, by J. R. Buchanan and N. F. Cross, June 1966

ORNL-NSIC-11 1965 Compilation of United States Nuclear Standards, 2nd Edition, 1965, by Wm. B. Cottrell, December 1965

ORNL-NSIC-12 Indexed Bibliography of Current Nuclear Safety Literature No. 3, by NSIC Staff, November 1965

ORNL-NSIC-13 Filters, Sorbents, and Air-Cleaning Systems as Engineered Safeguards in Nuclear Installations, by G. W. Keilholtz, October 1966

ORNL-NSIC-14 Indexed Bibliography of Current Nuclear Safety Literature No. 4, by NSIC Staff, March 1966

ORNL-NSIC-15 The Integrity of Reactor Pressure Vessels, by E. C. Miller, May 1966

ORNL-NSIC-16 Indexed Bibliography of Current Nuclear Safety Literature No. 5, by NSIC Staff, June 1966

ORNL-NSIC-17 Abnormal Reactor Operating Experiences, by USAEC Division of Operational Safety, August 1966

ORNL-NSIC-18 Compilation of National and International Nuclear Standards (Excluding U.S. Activities) 2nd Edition, 1966, by Wm. B. Cottrell, June 1966

ORNL-NSIC-19 Indexed Bibliography of Current Nuclear Safety Literature No. 6, by NSIC Staff, September 1966

ORNL-NSIC-20 Indexed Bibliography of Current Nuclear Safety Literature, No. 7, by NSIC Staff, November 1966

ORNL-NSIC-21 Technology of Steel Pressure Vessels for Water-Cooled Nuclear Vessels, by G. D. Whitman, G. C. Robinson, Jr., and A. W. Savolainen, Eds., December 1967

ORNL-NSIC-22 Missile Generation and Protection in Light-Water-Cooled Power Reactor Plants, by Richard C. Gwaltney, September 1968

ORNL-NSIC-23 Potential Metal-Water Reactions in Light-Water-Cooled Power Reactors, by Howard A. McLain, August 1968

ORNL-NSIC-24 Emergency Core-Cooling Systems for Light-Water-Cooled Power Reactors, by C. G. Lawson, September 1968

ORNL-NSIC-25 Air Cleaning as an Engineered Safety Feature in Light-Water-Cooled Power Reactors, by G. W. Keilholtz, C. E. Guthrie, and G. C. Battle, Jr., September 1968

ORNL-NSIC-26 Testing of Containment Systems Used with Light-Water-Cooled Power Reactors, by Frank C. Zapp, August 1968

ORNL-NSIC-27 Review of Methods of Mitigating Spread of Radioactivity From a Failed Containment System, by NSIC Staff, September 1968

ORNL-NSIC-28 Earthquakes and Nuclear Power Plant Design, by T. F. Lomenick and C. G. Bell, July 1970

ORNL-NSIC-29 Protection Instrumentation Systems in Light-Water-Cooled Power Reactor Plants, by H. G. O'Brien and C. S. Walker, October 1969

ORNL-NSIC-30 Compilation of United States Nuclear Standards, 3rd ed., 1966, USASI Subcommittee N6-9, Wm. B. Cottrell, December 1966

ORNL-NSIC-31 Index to *Nuclear Safety*, A Technical Progress Review by Chronology, Permuted Title, and Author, Vol. 1, No. 1 Through Vol. 7, No. 4, January 1967

ORNL-NSIC-32 Indexed Bibliography of Current Nuclear Safety Literature No. 8, by NSIC Staff, March 1967

ORNL-NSIC-33 Indexed Bibliography on Transportation and Handling of Radioactive Materials, by L. B. Shappert and R. S. Burns, June 1967

ORNL-NSIC-34 Indexed Bibliography of Current Nuclear Safety Literature No. 9, by NSIC Staff, May 1967

ORNL-NSIC-35 NSIC Keyword Thesaurus, August 1967

ORNL-NSIC-36 Indexed Bibliography of Current Nuclear Safety Literature No. 10, by NSIC Staff, August 1967

ORNL-NSIC-37 Fission Product Release and Transport in Liquid Metal Fast Breeder Reactors, by G. W. Keilholtz and G. C. Battle, Jr., March 1969

ORNL-NSIC-38 Compilation of National and International Nuclear Standards (Excluding U.S. Activities), 3rd ed., 1967, Wm. B. Cottrell, October 1967

ORNL-NSIC-39 (TID-24635) Sources of Tritium and Its Behavior Upon Release to the Environment, by D. G. Jacobs (published as AEC Critical Review Series, USAEC, Division of Technical Information, 1968)

ORNL-NSIC-40 Indexed Bibliography of Current Nuclear Safety Literature No. 11, by NSIC Staff, November 1967

ORNL-NSIC-41 Index to *Nuclear Safety*, A Technical Progress Review by Chronology, Permuted Title, and Author, Vol. 1, No. 1 Through Vol. 8, No. 6, February 1968

ORNL-NSIC-42 Indexed Bibliography of Current Nuclear Safety Literature No. 12, by NSIC Staff, February 1968

ORNL-NSIC-43 Compilation of United States Nuclear Standards, 4th ed., 1967, Wm. B. Cottrell, May 1968

ORNL-NSIC-44 Indexed Bibliography of Current Nuclear Safety Literature No. 13, by NSIC Staff, May 1968

ORNL-NSIC-45 Indexed Bibliography of Current Nuclear Safety Literature No. 14, by NSIC Staff, July 1968

ORNL-NSIC-46 A Summary of NSIC Activities, 1963-1967, by J. R. Buchanan and Wm. B. Cottrell, September 1968

ORNL-NSIC-47 Guidelines for Reviewers and the Editor at the Nuclear Safety Information Center, by H. B. Whetsel, January 1970

ORNL-NSIC-48 Information Scanning and Processing at the Nuclear Safety Information Center, by Celia Murphy and Carol Julian, 1970

ORNL-NSIC-49 (TID-24190) Plume Rise: Critical Survey, by G. A. Briggs (published as AEC Critical Review Series, USAEC, Division of Technical Information), 1969

ORNL-NSIC-50 Compilation of National and International Nuclear Standards (Excluding U.S. Activities), 4th ed., 1968, Wm. B. Cottrell, September 1968

ORNL-NSIC-51 Design Principles of Reactor Protection Instrument Systems, by S. H. Hanauer and C. S. Walker, September 1968

ORNL-NSIC-52 Indexed Bibliography of Current Nuclear Safety Literature No. 15, by NSIC Staff, October 1968

ORNL-NSIC-53 Patterns in Radiography Incidents and Overexposures, by R. L. Scott and E. N. Cramer, to be published

ORNL-NSIC-54 Indexed Bibliography of Current Nuclear Safety Literature No. 16, by NSIC Staff, January 1969

ORNL-NSIC-55 Comparison of Design Features for Light-Water-Power Reactors: A Special Report for the ACRS, compiled by C. G. Bell, September 1968

ORNL-NSIC-56 Guide to Nuclear Power Plant Staffing: Requirements, Training and Education Programs, by E. N. Cramer and H. B. Whetsel (published as WASH-1130, Utility Staffing for Nuclear Power, July 1969, USAEC, Division Nuclear Education and Training), July 1969

ORNL-NSIC-57 Compilation of U.S. Standards, 5th ed., Wm. B. Cottrell, 1968

ORNL-NSIC-58 Indexed Bibliography of Current Nuclear Safety Literature-17, by NSIC Staff, February 1969

ORNL-NSIC-59 Indexed Bibliography of Current Nuclear Safety Literature-18, by NSIC Staff

ORNL-NSIC-60 Index to *Nuclear Safety*, A Technical Progress Review by Chronology, Permuted Title, and Author, Vol. 1, No. 1 Through Vol. 9, No. 6, March 1969

ORNL-NSIC-61 Dynamic Conditions in Collision Tests of Vehicles Transporting Nuclear or Fissile Materials, by L. B. Shappert, W. C. Stoddart, and O. A. Kelly

ORNL-NSIC-62 Indexed Bibliography of Current Nuclear Safety Literature No. 19, by NSIC Staff, June 1969

ORNL-NSIC-63 Compilation of National and International Nuclear Standards (Excluding U. S. Activities), 5th ed., 1969, Wm. B. Cottrell, September 1969

ORNL-NSIC-64 Abnormal Reactor Operating Experiences 1966-1968, USAEC, October 1969

ORNL-NSIC-65 C. A. Burchsted and A. B. Fuller, Design, Construction and Testing of High Efficiency Air Filtration Systems for Nuclear Application, January 1970

ORNL-NSIC-66 Nuclear Reactor Siting Practice and Its Relationship to Population, by H. B. Piper, G. L. West, and F. A. Heddleson

ORNL-NSIC-67 Indexed Bibliography of Current Nuclear Safety Literature No. 20, by NSIC Staff, July 1969

ORNL-NSIC-68 Cask Designer's Guide, by L. B. Shappert, February 1970

ORNL-NSIC-69 Safety Related Occurrences in Nuclear Facilities Reported in 1967—1968, by W. R. Casto and E. N. Cramer, July 1970

ORNL-NSIC-70 Indexed Bibliography of Current Nuclear Safety Literature No. 21, by NSIC Staff, October 1969

ORNL-NSIC-71 Indexed Bibliography of Current Nuclear Safety Literature No. 22, by NSIC Staff, January 1970

ORNL-NSIC-72 Indexed Bibliography of Current Nuclear Safety Literature No. 23, by NSIC Staff, February 1970

ORNL-NSIC-73 Index to *Nuclear Safety*, A Technical Progress Review by Chronology, Permuted Title, and Author, Vol. 1, No. 1 Through Vol. 10, No. 6, April 1970

ORNL-NSIC-74 Calculation of Doses Due to Accidentally Released Plutonium from an LMFBR, by G. W. Keilholtz, to be published

ORNL-NSIC-75 Personnel Involved in the Development of Nuclear Standards in the United States, by J. P. Blakely, June 1970

ORNL-NSIC-76 Compilation of U.S. Nuclear Standards, 6th Edition, 1969, William B. Cottrell, July 1970

ORNL-NSIC-77 Power Reactor Water Use and Thermal Effects Studies, by Environmental Quality Study Project, to be published

ORNL-NSIC-78 Compilation of National and International Nuclear Standards (Excluding U.S. Activities) 6th Edition, 1970

ORNL-NSIC-79
ORNL-TM-3009 Summary of Environmental Information Activities of the Nuclear Safety Information Center, by Wm. B. Cottrell and J. R. Buchanan, June 1970

ORNL-NSIC-80
ORNL-TM-3078 The Operation of a Specialized Scientific Information and Data Analysis Center with Computer Base and Associated Communications Network, by Wm. B. Cottrell, J. R. Buchanan, and D. W. Cardwell, June 1970

ORNL-NSIC-81 Indexed Bibliography of Thermal Effects Literature-1, by J. G. Morgan, Reactor Chemistry Division, and J. K. Franzreb, Reactor Division, December 1970

ORNL-NSIC-82 Annotated Bibliography on Chemical and Physical Properties of Methyl Iodide and Its Occurrences Under Reactor Accident Conditions, by L. F. Parsly

ORNL-NSIC-83 Safety-Reliability of Reactor Systems, by Paul Rubel

ORNL-NSIC-84 Indexed Bibliography on Transportation and Handling of Radioactive Materials-2, by R. D. Seagren and L. B. Shappert

ORNL-NSIC-85 Compilation of U.S. Nuclear Standards, 7th Edition, 1970, J. P. Blakely, June 1971

ORNL-NSIC-86 Index to Nuclear Safety, A Technical Progress Review by Chronology, Permuted Title, and Author, Vol. 1, No. 1, Through Vol. 11, No. 6

ORNL-NSIC-87 Safety-Related Occurrences in Nuclear Facilities as Reported in 1969, by R. L. Scott and W. R. Casto

ORNL-NSIC-88 Indexed Bibliography of Literature on Seismic Considerations in the Siting of Nuclear Facilities-1, by W. C. McClain and O. H. Myers

ORNL-NSIC-89 Biological Concentration and Turnover of Radionuclides in Food Chains: A Bibliography, by D. E. Reichle, D. J. Nelson, and P. B. Dunaway

Appendix E

SOURCE CODES FOR AVAILABILITY CITATIONS

The following is a list of codes used for availability listing. This code is put under columns 41 through 49 on the greensheet, with the public availability on the top line and the local availability on the bottom line (see Fig. 6).

Code	Address
AE	Aktiebolaget Atomenergi, Library Section, Box 43041, Stockholm 43, Sweden
AEC-DOS	USAEC, Division of Operational Safety, Washington, D. C. 20545
AEC-DPI	USAEC, Division of Public Information, Washington, D. C. 20545
AECL	Atomic Energy of Canada Ltd., Scientific Document Distribution Office, Chalk River, Ont., Canada
AUSTRALIA	Library, Australian Atomic Research Establishment, Private Mail Bag, Sutherland, New South Wales, Australia
BELGIUM	Centre d-Etude de l-Energie Nucleaire (C.E.N.), Studiecentrum voor Kernenergie (S.C.K.), Technical Information Dept., MOL-DONK, Belgium
CISE	CISE Press Office, Casella Postale 3986, Milano, Italy
CNEN	Comitato Nazionale per l-Energia Nucleare, Divisione Affari Internazionali e Studi Economici, Ufficio Pubblicazioni, Via Belisario, 15, Roma, Italy
CEA	La Documentation Francaise, 31 quai Voltaire, 75, Paris (7e), France
CERN	CERN European Organization for Nuclear Research, Geneva 23, Switzerland
DANATOM	Danatom, Aurehojvej 2, Hellerup, Denmark
DEP (and DEP/MN)	USAEC Depository Libraries in the U.S. and overseas

DTIE	USAEC, Division of Technical Information Extension, P. O. Box 62, Oak Ridge, Tenn. 37830
DESY	Deutsches Elcktronen-Synchrontron DESY, Dokumentation, 2000 Hamburg 52, Notkestieg 1, Germany
EURATOM	Office central de vente des publications des Communautes Europeennes, 2, place de Metz, Luxemburg
EIR	Eidgenossisches Institut fuer Reaktorforschung, c/o Bibliothek, 5303 Wurenlingen, Switzerland
GMELIN	Atomic Energy Documentation Center, Gmelin Institute, 40-42 Varrentrappstrasse, Frankfurt (Main), West Germany
GPO	Superintendent of Documents, U.S. Government Printing Office, Washington, D. C. 20402
HMSO	Her Majestys Stationery Office, Head Office, Atlantic House, Holborn Viaduct, London E.C.1., England
IAEA	National Agency for International Publications, Inc., 317 East 34th Street, New York, N.Y. 10016
ISRAEL	Israel Atomic Energy Commission, Soreq Nuclear Research Centre, Yavne, Israel
JAERI	Staff Supply Cooperative of Japan Atomic Energy Research Institute, Tokai-mura, Naka-gun, Ibaraki-ken, Japan
JCL	Special Libraries Association Translation Center, John Crerar Library, 35 West 33rd Street, Chicago, Ill. 60616
JEN	Servico de Documentation, Junta de Energia Nuclear, Ciudad Universitaria, Madrid (3)+ Espana
JUL	Jul. Gjellerup, Booksellers, 87 Solvgade, Kobenhavn K, Denmark
JULICH	Zentralbibliothek der Kernforschungsanlage Julich, Julich, Bundesrepublik Deutschland
H-M	Hahn-Meitner-Institute fuer Kernforschung, Berlin, Bibliothek, Glicnicker Strasse 100, 1 Berlin 39, Germany
KFK	Gesellschaft fuer Kernforschung mbh, 75 Karlsruhe, Postfach 947, Germany
KR	Library, Institute for Atomenergi, Box 40, Kjeller, Norway

N.Z.	Librarian, N.Z. Institute of Nuclear Sciences, D.S.I.R., Private Bag, Lower Hutt, New Zealand
NAS	National Academy of Sciences, National Research Council, Washington, D. C. 20418
NORW	Norwegian Defense Research Establishment, Library, P. O. Box 25, Kjeller, Norway
NRC	National Research Council of Canada, Ottawa, Ontario, Canada
NTIS	National Technical Information Service, U.S. Department of Commerce, Springfield, Va. 22151 $3.00 copy, $0.95 microfiche
PAK	Atomic Energy Center, P. O. Box 658, Lahore, West Pakistan
Patents (Brit)	The Patent Office, 25 Southampton Building, London, W.C. 2, England ($0.49/copy)
Patents (For)	Foreign patents may be obtained in photocopy from the U.S. Patent Office, Department of Commerce, Washington, D. C. ($0.30/page)
Patents (US)	The U.S. Patent Office, Department of Commerce, Washington, D. C. ($0.25/copy)
PDR	USAEC Public Document Room, 1717 H St., Washington, D. C. 20545 ($0.25/page)
RCN	Reactor Centrum Nederland, 112 Scheveningsweg, s-Gravenhage, The Netherlands
SCRPI	Ministere de la Sante Publique, Service Central de Protection Centre Les Rayonnements Ionisants, B.P. no. 78, Le Vesinet, France
Tokyo	Institute for Nuclear Study, University of Tokyo, Tanashi-Machi, Kitatama-gun, Tokyo, Japan
TURKEY	T.A.E.C., Cekmece Nuclear Research Center, P. O. Box 1, Airport, Istanbul, Turkey
VDDIT	Aktiebolaget Atomenergi, Information Office, Scientific and Technical Information, Box 43041, Stockholm 43, Sweden
UKAEA	United Kingdom Atomic Energy Authority, 11 Charles II Street, London, S.W.1, England

UN	Sales Section, Room 1059, United Nations Headquarters, New York, N.Y. 10017
USGS	U.S. Geological Survey, Washington, D. C. 20402

ORNL-NSIC-48

INTERNAL DISTRIBUTION

1. T. D. Anderson
2. S. E. Beall
3. J. P. Blakely
4. C. D. Bopp
5. R. H. Bryan
6. J. R. Buchanan
7. R. M. Carroll
8. W. B. Cottrell
9. C. C. Coutant
10. F. L. Culler
11. F. M. Empson
12. B. R. Fish
13. M. H. Fontana
14. J. K. Franzreb
15. R. D. Gallaher
16. J. H. Gibbons
17. E. W. Hagen
18. P. H. Harley
19. F. A. Heddleson
20. S. P. Hendrix (Consultant)
21. D. N. Hess
22. R. F. Hibbs
23. C. F. Holoway
24. B. L. Houser
25. W. H. Jordan
26. G. W. Keilholtz
27. T. S. Kress
28. H. A. McLain
29. J. G. Morgan
30. H. B. Piper
31. J. N. Ramsey
32. R. L. Scott
33. R. D. Seagren
34. M. J. Skinner
35. F. T. Snyder
36. W. G. Stockdale
37. B. H. Stoutt (K-25)
38. D. A. Sundberg
39. C. A. Sweet
40. M. L. Tobias
41. J. L. Wantland
42. A. M. Weinberg
43. H. B. Whetsel
44. M. L. Winton
45. M. M. Yarosh
46. S. L. Yount (K-25)
47. Biology Library
48. ORNL Y-12 Technical Library Document Reference Section

49-51. Central Research Library

52-86. Laboratory Records Department

87. Laboratory Records, ORNL-RC

88-137. Nuclear Safety Information Center, J. R. Buchanan, Building 9711-1, Y-12

138-157. Other ORNL Information Centers

EXTERNAL DISTRIBUTION

158-161. H. B. Atkinson, AEC-DTI
162. G. K. Ellis, AEC-DTI
163. F. A. Gifford, NOAA-ORO
164. S. D. Swisher, NOAA-ORO
165-168. A. J. Pressesky, AEC-RDT
169. J. E. McEwen, AEC-RDT
170. S. J. Lanes, AEC-RDT
171. J. A. Swartout, UCC, New York, N. Y., 10017
172. Laboratory and University Division, AEC-ORO
173. Patent Office, AEC-ORO
174-175. USAEC Division of Technical Information Extension